



Arthur J. Gallagher & Co.  
BUSINESS WITHOUT BARRIERS™

# Actuarial Audit of NDPERS Plan Design Study Summary of Findings

DOUG ANDERSON | SEPTEMBER 19, 2014

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*This report is intended for use by the North Dakota Public Employees Retirement System Board of Directors. The purpose of the report is to summarize results of an independent review by Gallagher Benefit Services, Inc. of information originally prepared by The Segal Company for the NDPERS relative to the cost of potential NDPERS changes.*

*Participant data for this review was provided by both NDPERS and The Segal Company and the results included herein are dependent on the accuracy of that data. Results were based on an attempted match of the July 1, 2013 actuarial valuation report, the plan provisions in effect at that time, and except as noted, the assumptions used for that valuation.*

*Gallagher Benefit Services, Inc. expresses no opinion on the proposed plan design changes other than providing a range of reasonable cost forecasts as noted in this report. The actuary preparing this report is a member of the American Academy of Actuaries and meets the Qualification Standards to provide the actuarial opinions contained in this report.*

# Participant Data Review

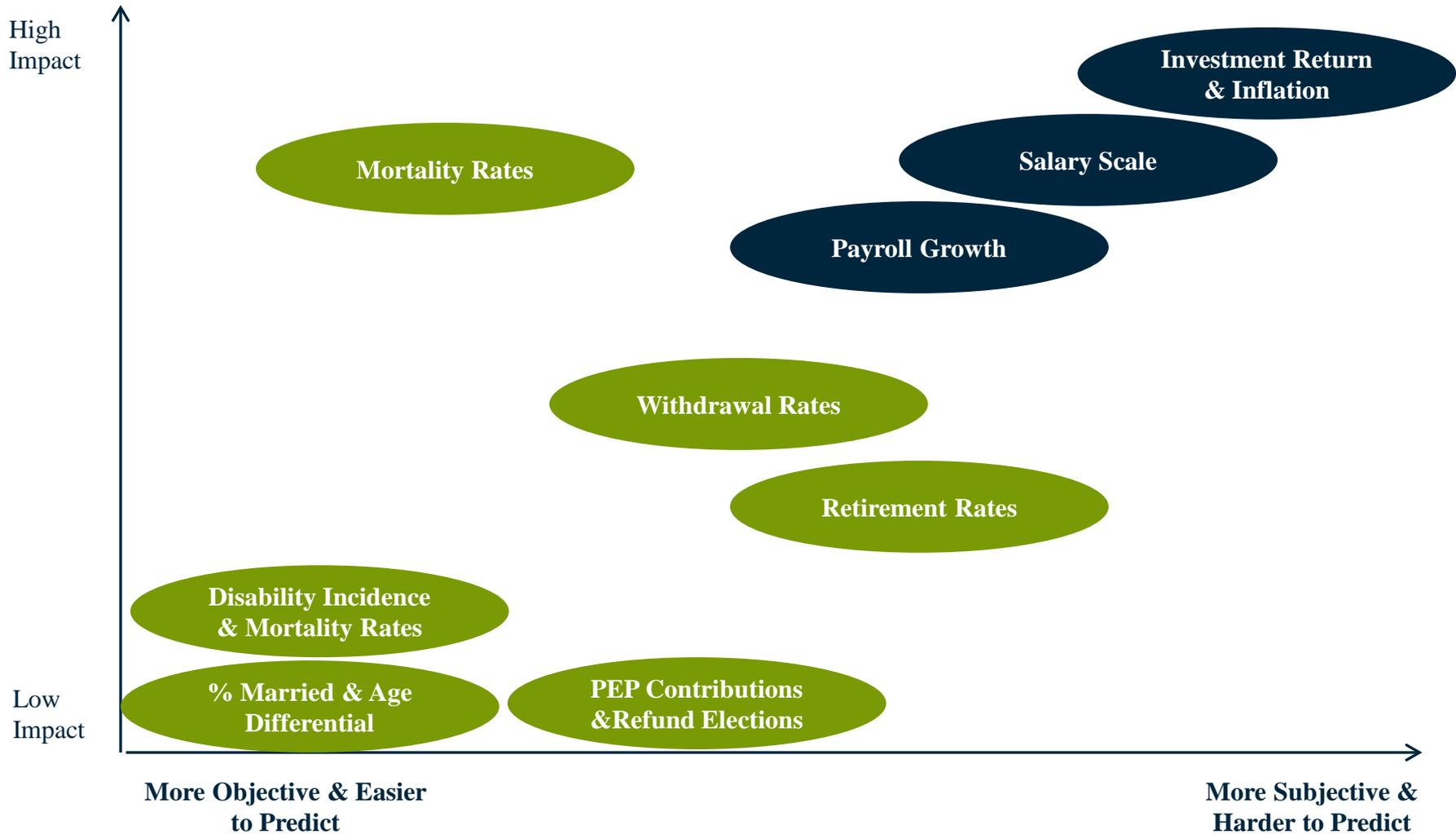
# Participant Data Review

Gallagher found that the data file provided by NDPERS and the data file used by Segal in their valuation matched and had reasonable field values for over 99% of the records. The remaining less than 1% had issues as noted here.

Issue	Count	Comments
Missing Records	63	Based on EEID, 60 records (mostly retirees) from NDPERS don't appear in Segal's file; 3 records from Segal don't appear in NDPERS file.
Spouse DOB	1	NDPERS reported year as 2080; Segal appeared to correct to 1980
Benefit Amount	6	Benefit amount differs for 6 retirees; differences range from 5.6% high to 15.3% high.
Deferred Benefit Amount	138	NDPERS reports benefit amount for vested terminated participants as \$0; Segal shows benefit as >\$0.
Employee Contributions	38	NDPERS reports employee account balance as \$0; Segal shows balance as >\$0. 36 of 38 are new hires; 2 are retirees.
Benefit Service	37	NDPERS reports benefit service as 0; Segal shows service as >0. 36 of 37 are new hires; 1 is terminated vested.

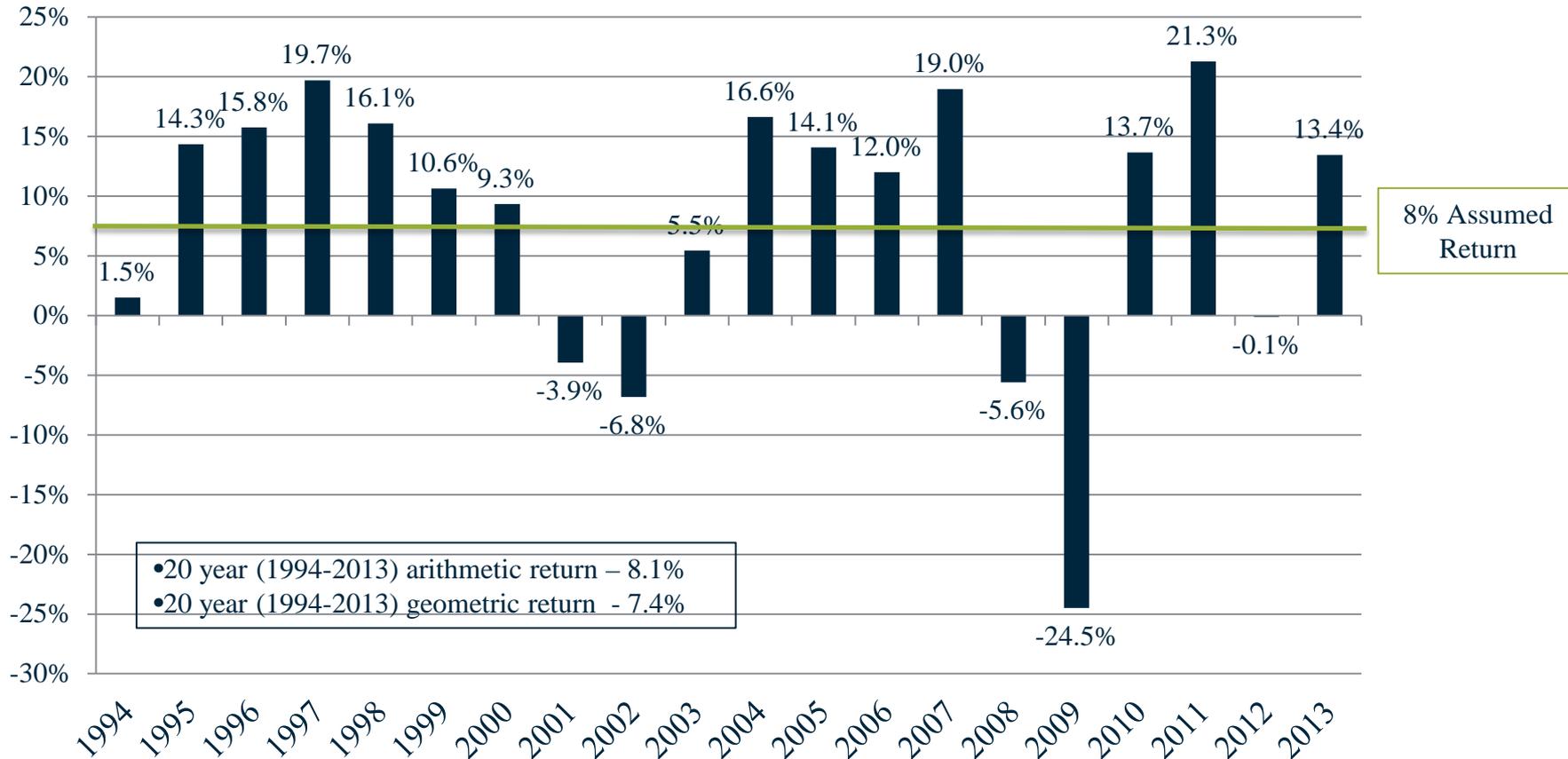
# Assumption Review

# Assumptions by Impact & Predictability



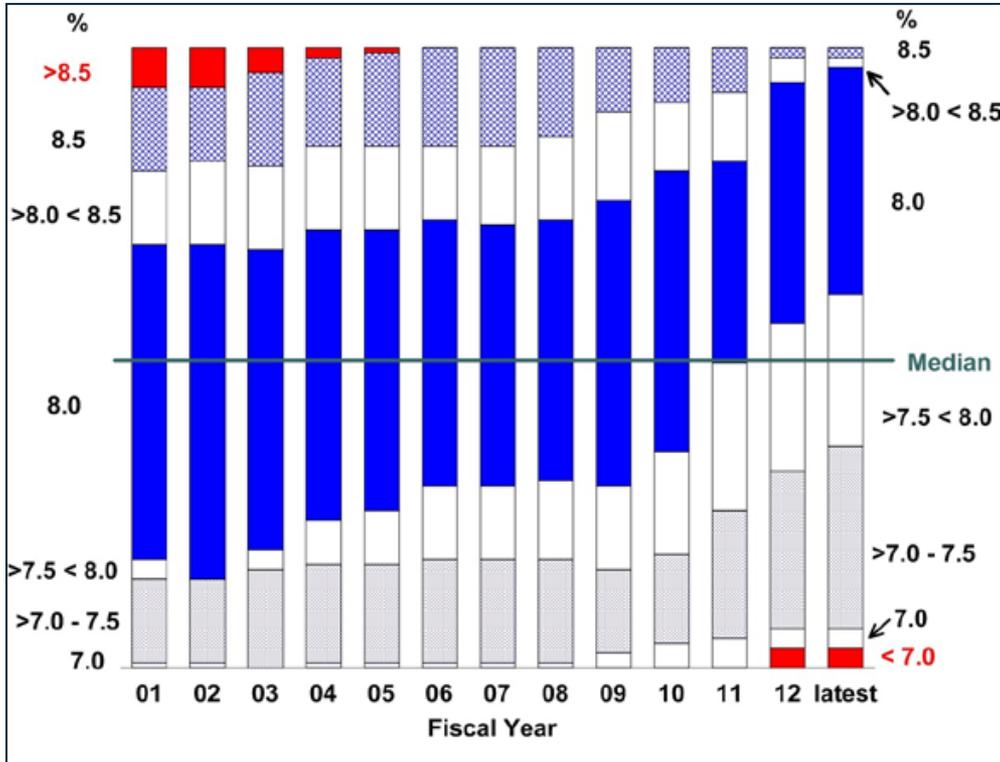
# NDPERS Actual Investment Returns

## Annual Investment Return (net of expenses)

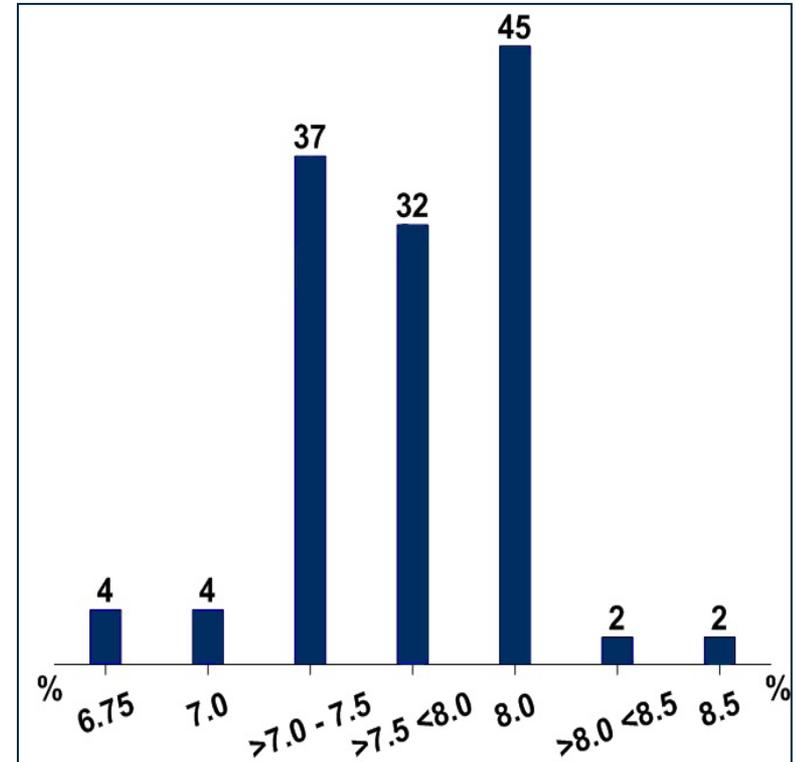


# Economic Assumptions - Investment Return

Investment return assumptions for Public Sector Plans have been trending down over the past 12 years.



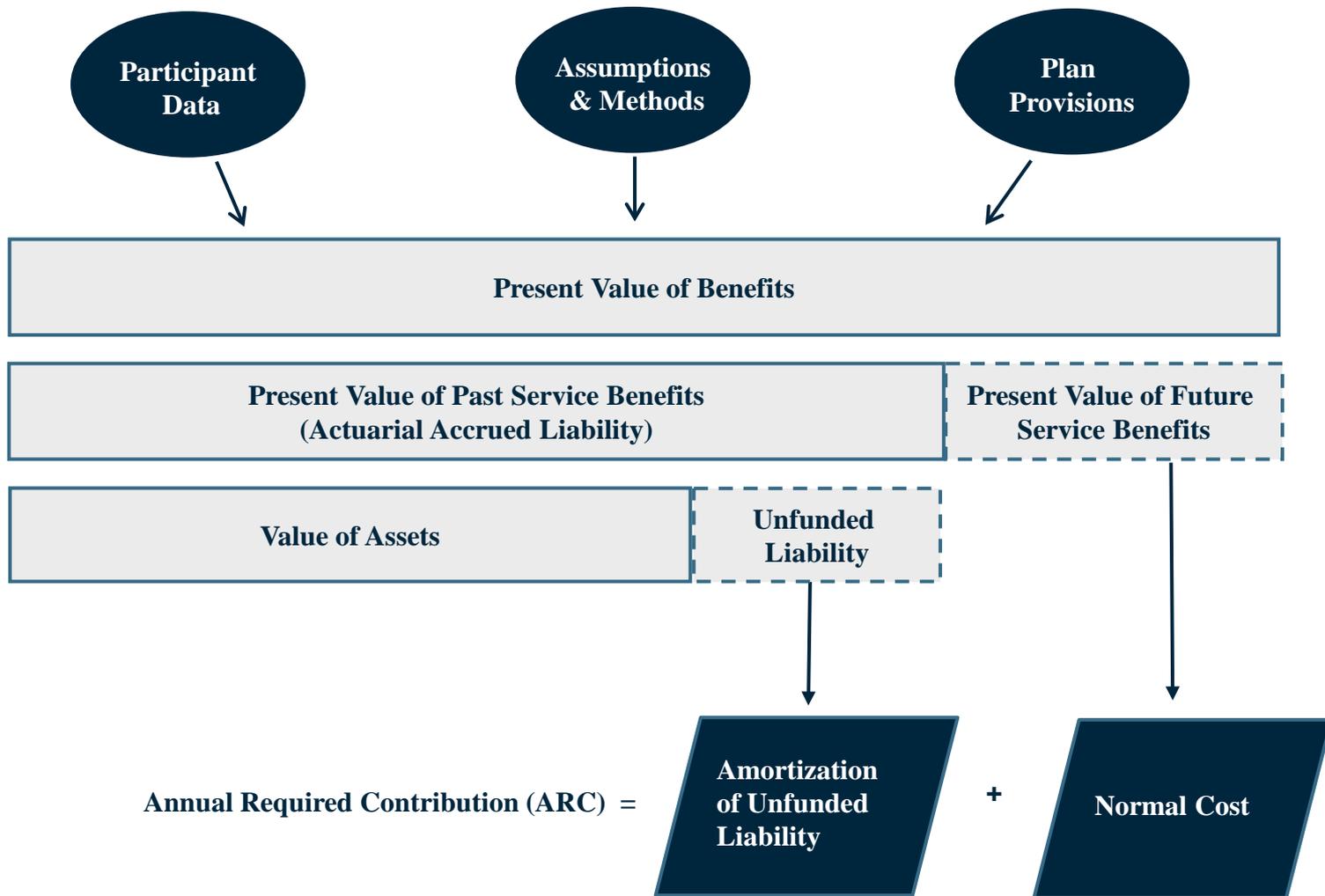
Investment return assumptions for most Public Sector Plans range from 7.5% to 8.0%.



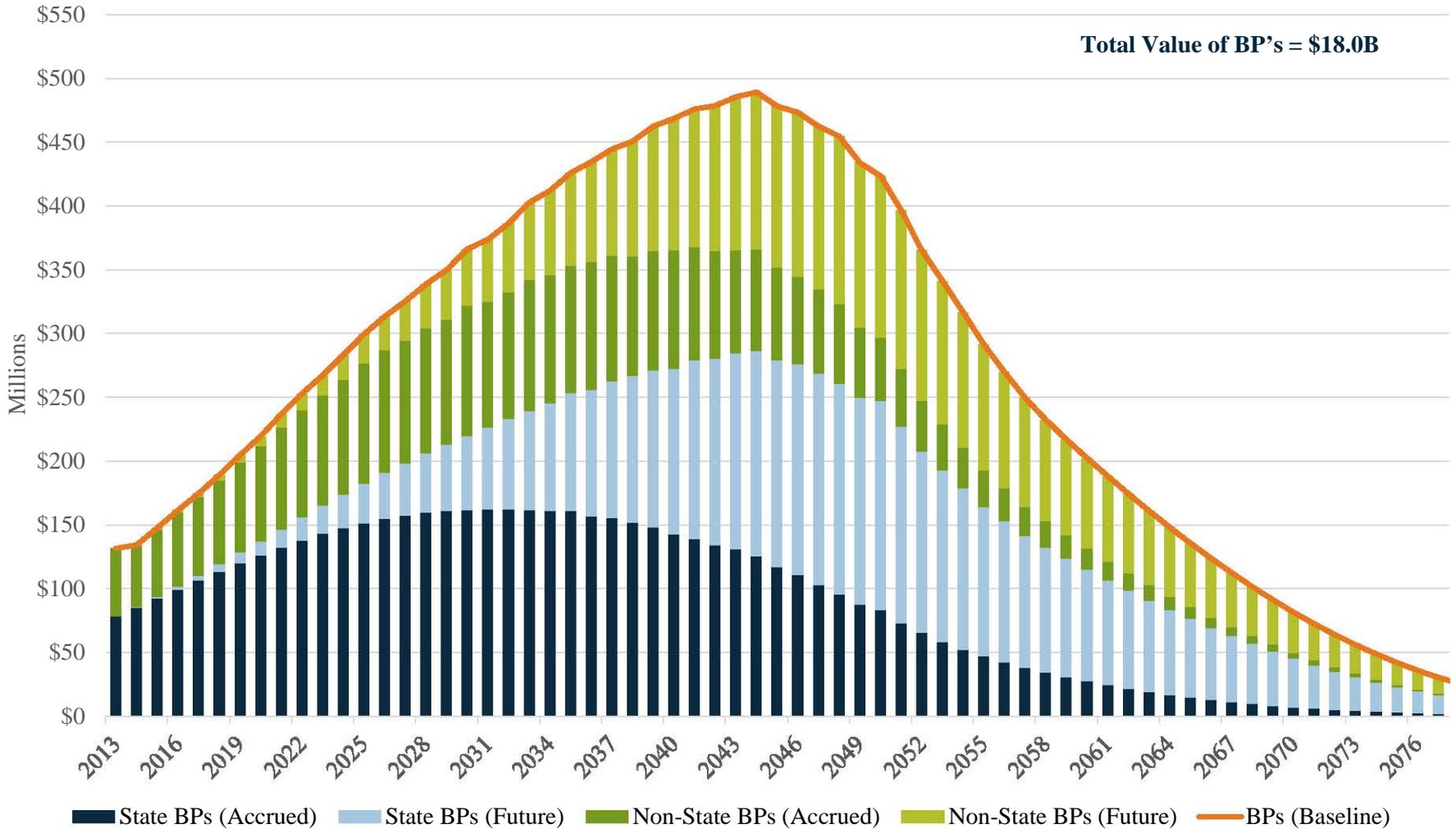
Source: NASRA Issue Brief: Public Pension Plan investment Return Assumption, Updated April 2014

# 2013 Actuarial Valuation Replication Audit

# Actuarial Valuation Process

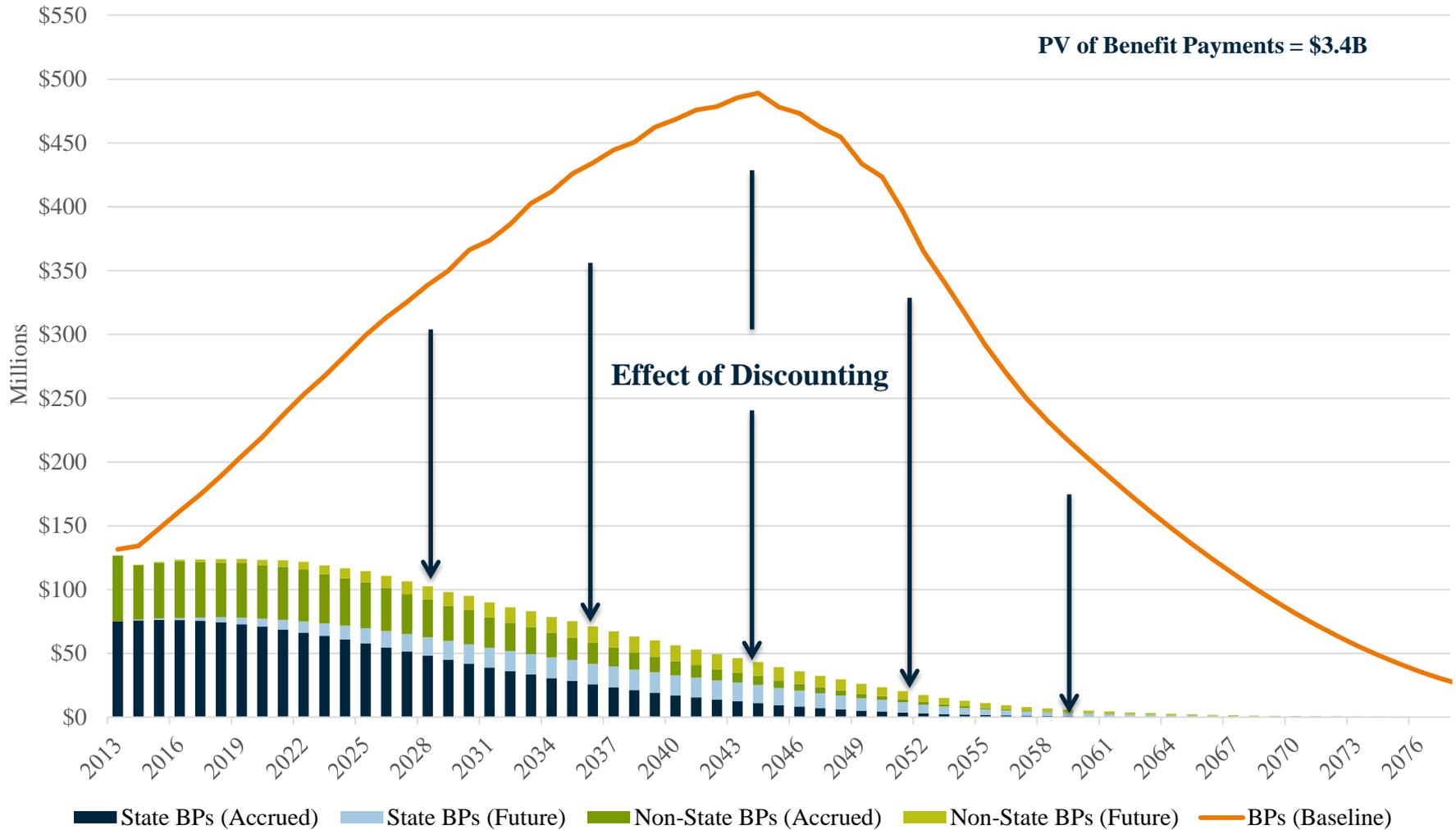


# Projected Benefit Payments



Projected benefit payments are primarily determined by demographic assumptions.

# Discounted Benefit Payments



Discounted values are determined by the investment return assumption.

# Plan Liability Audit Results

	Segal July 1, 2013 Actuarial Valuation	Gallagher Results	Difference
<b><i>Present Value of Benefits</i></b>			
Active Members:			
▪ Retirement	\$ 1,976,691,333	\$ 1,975,840,698	0.0%
▪ Disability	51,346,152	49,765,185	(3.1%)
▪ Withdrawal	198,418,550	184,731,918	(6.9%)
▪ Death	<u>59,213,630</u>	<u>58,586,035</u>	(1.1%)
<b>Actives Total:</b>	\$ 2,285,669,665	\$ 2,268,923,836	(0.7%)
Retired Members and Beneficiaries*	943,671,725	940,013,710	(0.4%)
Inactive Non-retired Members	<u>154,900,691</u>	<u>159,939,147</u>	3.3%
Total PVB	\$ 3,384,242,081	\$ 3,368,876,693	(0.5%)
<b><i>Development of Unfunded Actuarial Accrued Liability</i></b>			
Actuarial Accrued Liability:			
▪ Active Members	\$ 1,551,952,602	\$ 1,617,869,073	4.2%
▪ Retired Members and Beneficiaries*	943,671,725	940,013,710	(0.4%)
▪ Inactive Non-retired Members	<u>154,900,691</u>	<u>159,939,147</u>	3.3%
▪ Total AAL	\$ 2,650,525,018	\$ 2,717,821,930	2.5%
<b><i>Actuarial Value of Assets</i></b>	<u>1,632,915,720</u>	<u>1,632,915,720</u>	0.0%
<b><i>Unfunded Actuarial Accrued Liability</i></b>	\$ 1,017,609,298	\$ 1,084,906,210	6.6%

\*Includes Special Prior Service Pensions

# ARC and Amortization Period Audit Results

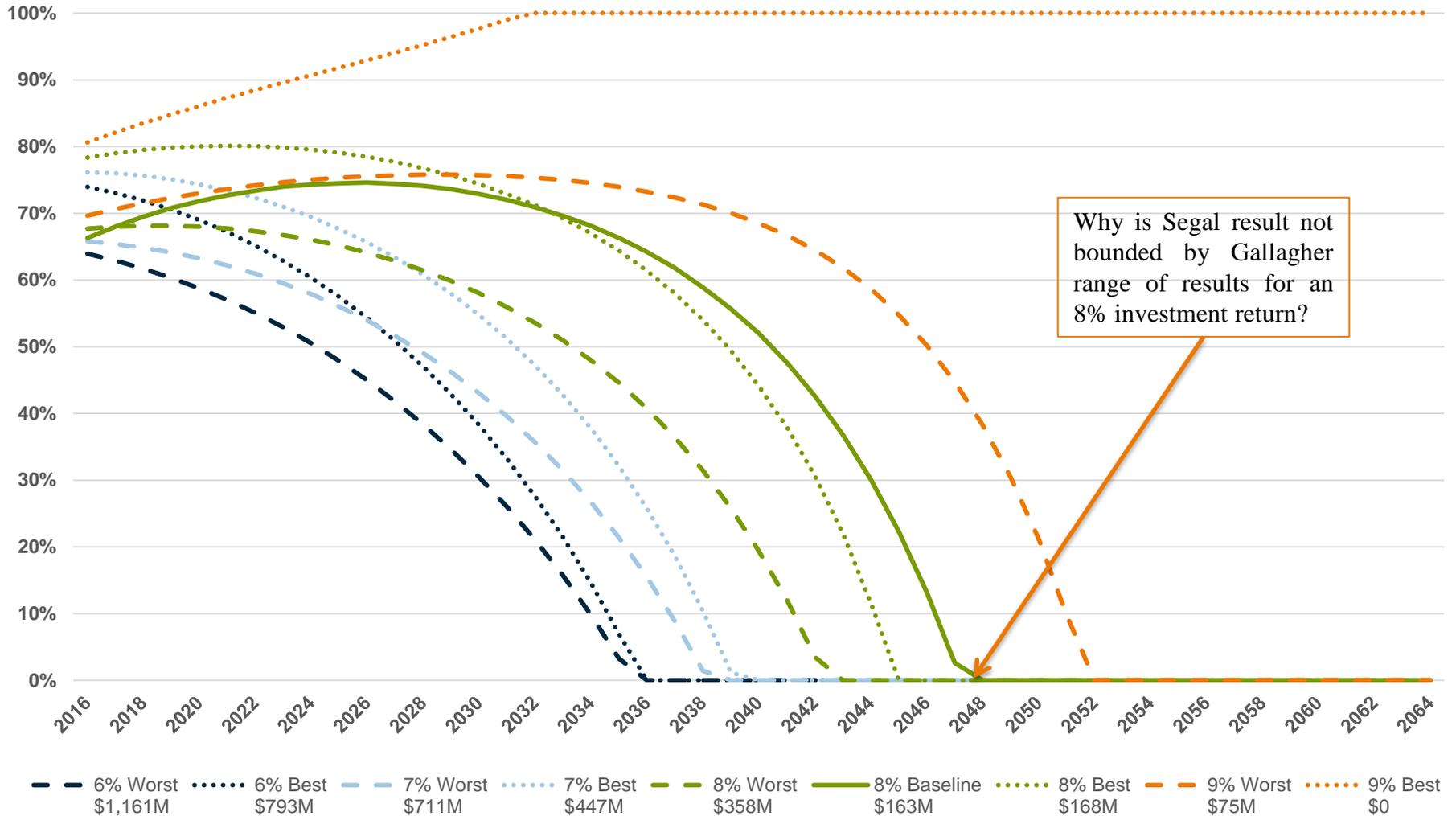
	Segal July 1, 2013 Actuarial Valuation	Gallagher Results	Difference
<b><i>Development of Annual Required Contribution (ARC)</i></b>			
Normal Cost	\$ 89,254,673	\$ 88,160,907	(1.2%)
Member Contributions (6.5%)	<u>(56,281,437)</u>	<u>(56,360,431)</u>	0.1%
Net Employer Normal Cost	\$ 32,973,236	\$ 31,800,476	(3.6%)
Administrative Expense	1,100,000	1,100,000	0.0%
Amortization of UAAL	<u>71,019,268</u>	<u>75,715,897</u>	<u>6.6%</u>
Annual Required Contribution	\$ 105,092,504	\$ 108,616,373	3.4%
Total Payroll	\$ 865,868,265	\$ 867,083,551	0.1%
Total ARC Percentage	12.14%	12.53%	3.2%
<b><i>Development of Amortization Period</i></b>			
Annual Required Contribution	12.14%	12.53%	3.2%
Member Contribution Increase	(0.50%)	(0.50%)	0.0%
Total Scheduled Contribution	<u>(7.12%)</u>	<u>(7.12%)</u>	0.0%
Contribution (Surplus)/Deficit	4.52%	4.91%	8.6%
Amortization Period	Infinite	Infinite	

# Plan Closure Study Audit Findings

# Plan Options Evaluation Summary (Preliminary)

## Main Systems – State Plan Closed (separated from Poli Sub)

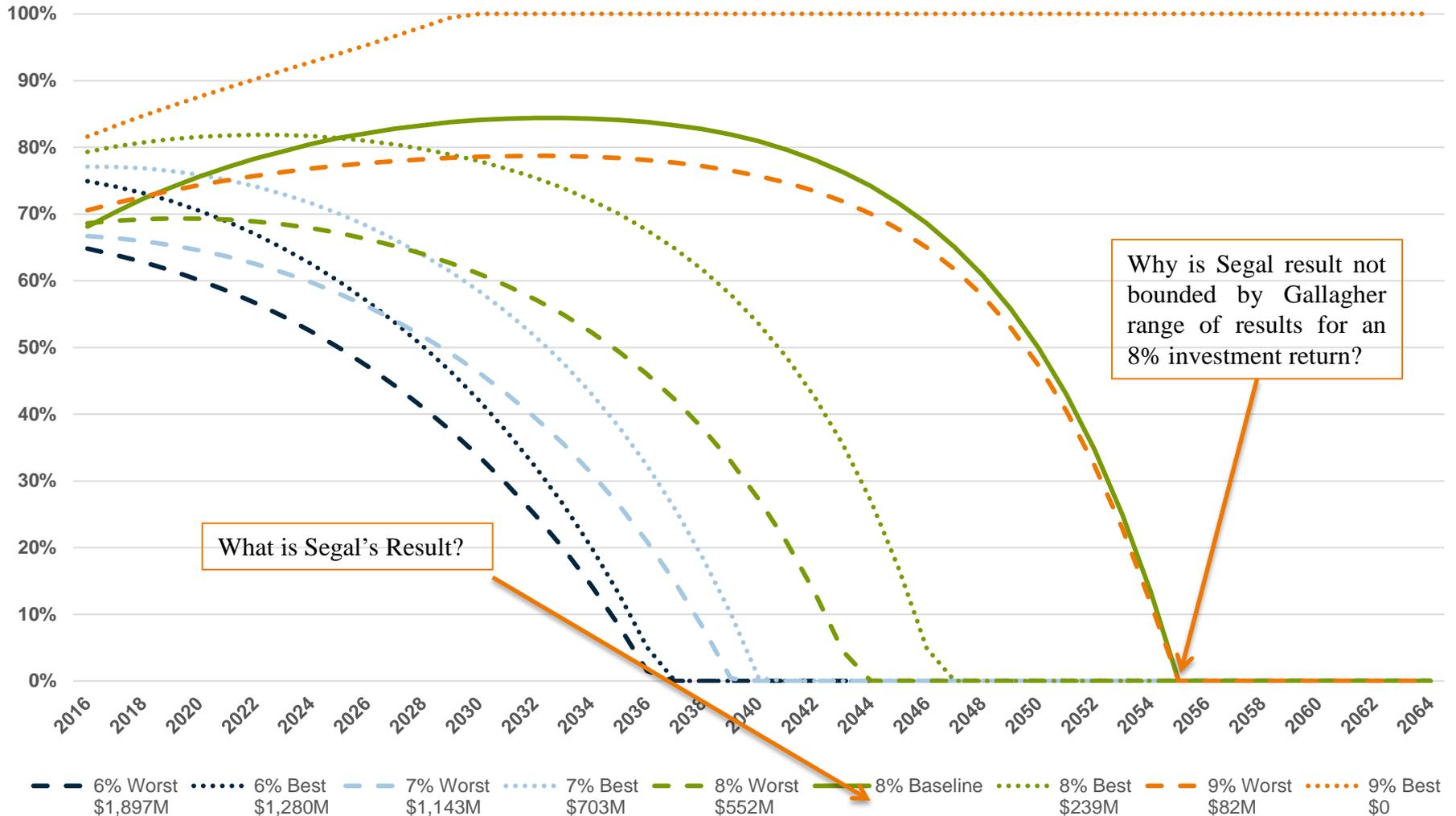
### Funded Status



# Plan Options Evaluation Summary (Preliminary)

## Main Systems – Existing Plan with No New Entrants as of 1/1/2016

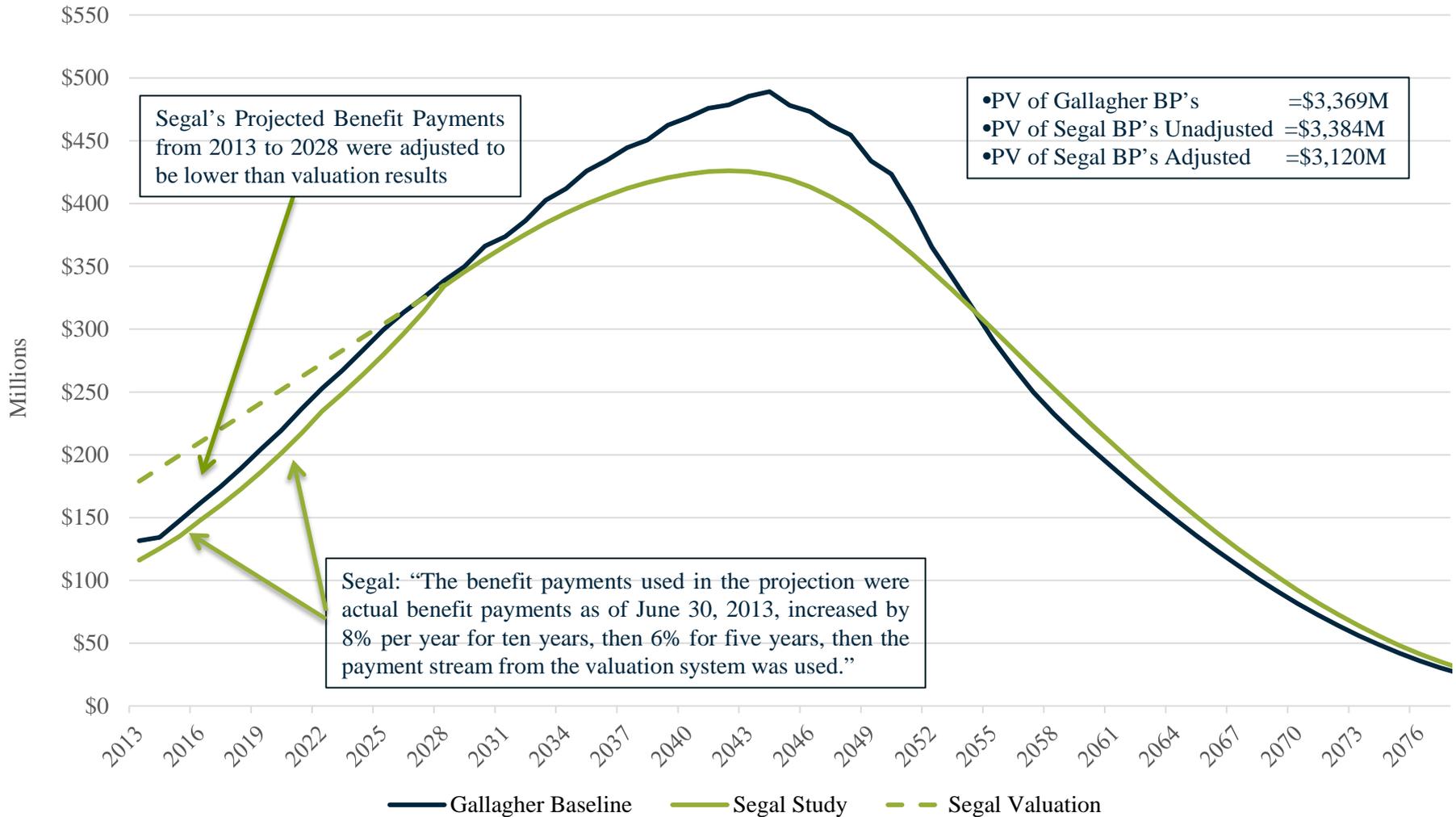
### Funded Status



# Plan Closure Study Actuarial Audit Findings

	Gallagher Finding	Gallagher Comments
Issue #1 Disclosure	<ul style="list-style-type: none"> <li>Segal’s March 6, 2014 Study results are not consistent with their July 1, 2013 Actuarial Valuation results.</li> <li>Segal made adjustments to the July 1, 2013 valuation outputs to reduce projected benefit payments from years 2014 through 2028 without disclosing in their report the reason for the change or the magnitude of the cost impact.</li> <li>The adjustments reduced estimated plan costs by \$264M.</li> </ul>	<ul style="list-style-type: none"> <li>Segal’s March 6, 2014 study states that “cost estimates are based on the July 1, 2013 actuarial valuation results.”</li> <li>Actuarial Standards of Practice (ASOP) No. 41 states that an actuarial report should “identify the methods, procedures, assumptions, and data used by the actuary with sufficient clarity that another actuary qualified in the same practice area could make an objective appraisal of the reasonableness of the actuary’s work as presented in the actuarial report.”</li> </ul>
Issue #2 Methodology	<ul style="list-style-type: none"> <li>The reason provided for the adjustment, fewer observed retirements than expected, was identified in the July 1, 2013 Actuarial Valuation as <i>increasing</i> costs. This contradicts the reductions in the Study.</li> <li>Segal said no other adjustments were made, implying no offsetting increases for increased benefits at later retirements or higher contributions due to later retirements.</li> </ul>	<ul style="list-style-type: none"> <li>Segal explained the reduction in projected benefit payments was due to “The current valuation assumptions (as approved by the Board of Trustees) appear to have higher rates of assumed retirement than are currently being observed.”</li> <li>Gallagher results (see July 1 presentation) have shown that adjustments due to retirement assumptions do not significantly impact present values. A \$264M present value adjustment due to retirement differences seems disproportionately large.</li> </ul>
Issue #3 Omission	<ul style="list-style-type: none"> <li>Segal excluded from the Study the impact of Participants entering after 7/1/2013 and before the assumed closure date of 1/1/16.</li> </ul>	<ul style="list-style-type: none"> <li>The inclusion of Participants during this period adds significant benefit payments to the Plan. However, additional assumed Member and Employer contributions are nearly offsetting.</li> </ul>

# Comparison of Project Benefit Payments



# Comparison of Values

<b>Estimated Present Value as of July 1, 2013 for:</b>	<b>Segal</b>	<b>Gallagher</b>	<b>Difference</b>
July 1, 2013 Actuarial Valuation Result	\$3,384M	\$3,369M	(\$15M)
Segal Adjustments for Study	<u>    (264M)</u>	<u>        0M</u>	<u>    264M</u>
All Participants as of 7/1/13	\$3,120M	\$3,369M	\$249M
New Participants entering between 7/1/13 and 1/1/16	<u>        0M</u>	<u>    112M</u>	<u>    112M</u>
All Participants entering before 1/1/16	\$3,120M	\$3,481M	\$361M
<b>Estimated Future Contributions for:</b>			
New Participants entering between 7/1/13 and 1/1/16	\$0M	\$155M	\$155M
<b>Projected Values for Closed State Employee Only</b>			
Years to insolvency	35 Years	30 Years	5 Years
One-time contribution to fully fund	\$163M	\$301M	\$138M
<b>Projected Values if Both Groups are Closed</b>			
Years to insolvency	42 Years	32 Years	10 Years
One-time contribution to fully fund	\$99M	\$445M	\$346M

# Investment Return Sensitivity Analysis

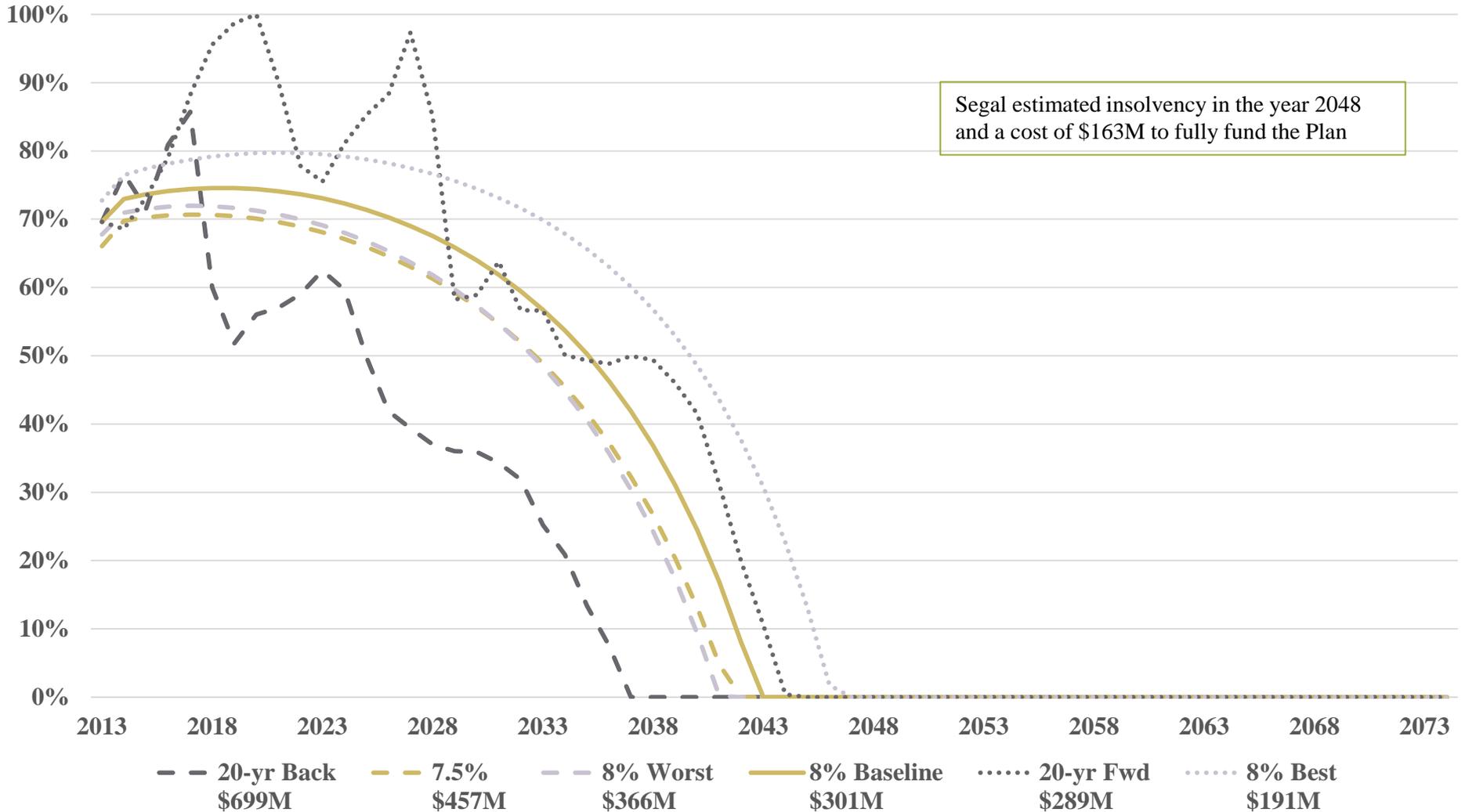
# Summary of Significant Assumptions

Actuarial projection results will vary based on assumptions for future expectations. The sensitivity of results to different assumptions can help provide a better understanding of a reasonable range of outputs. The projections on the following pages include results under Segal's assumptions as well as under two sets of assumptions developed by Gallagher representing a cost favorable set of assumptions and cost unfavorable set of assumptions.

	NDPERS July 1, 2013 Valuation	Gallagher Recommended Assumption Sets for Sensitivity Analysis	
		Cost Favorable (8% Best)	Cost Unfavorable (8% Worst)
Salary Increases	Rates based on Experience Study	10% lower	10% higher
Mortality Rates	Rates based on Experience Study	Study rates without Male margin	RP 2000 Table with projected improvements
Withdrawal Rates	Rates based on Experience Study	10% lower	10% higher
Retirement Rates	Rates based on Experience Study	Shifted later	Shifted earlier

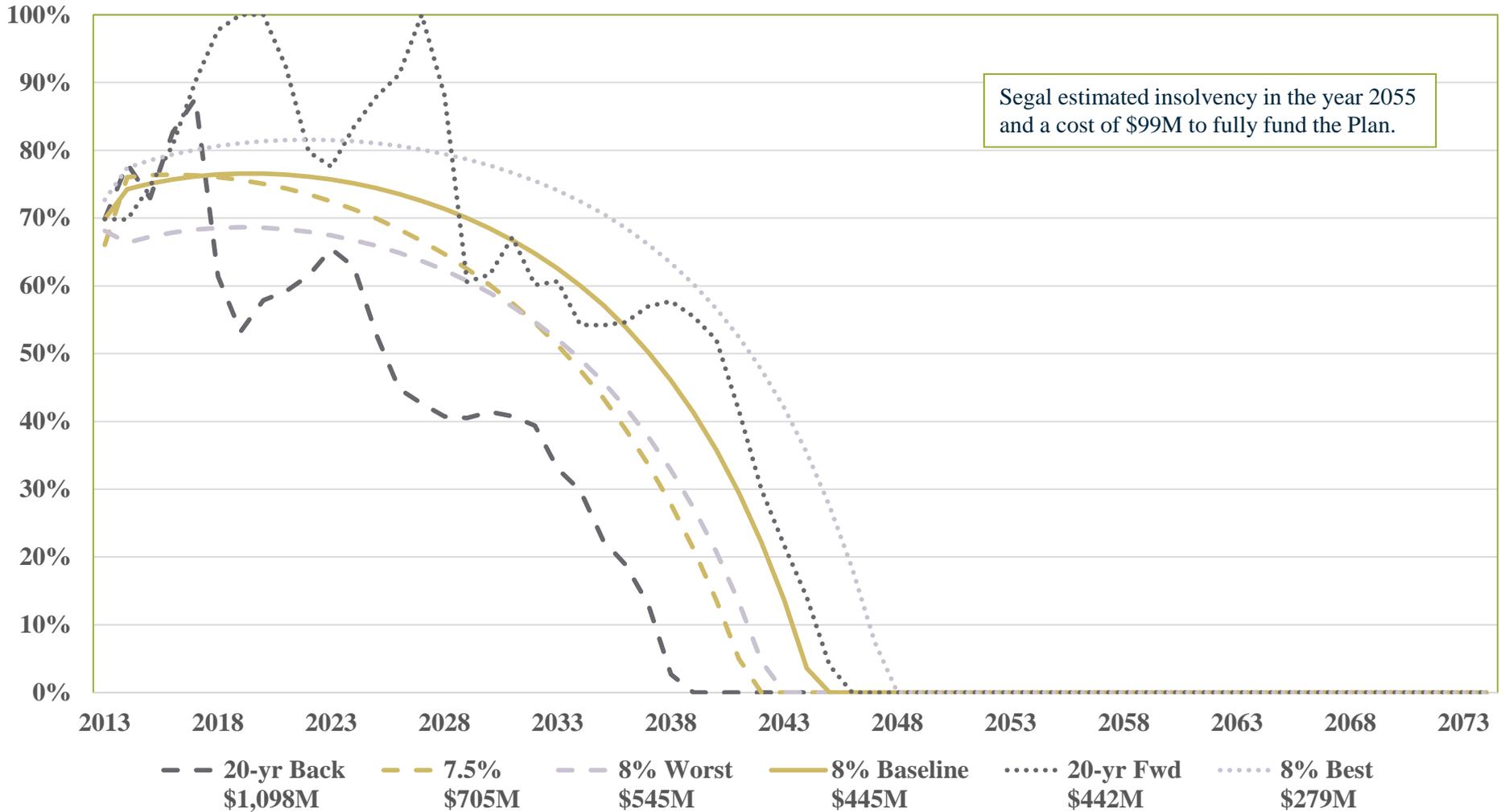
# Plan Options Evaluation Summary

State Plan Closed, Separated from Political Subdivisions



# Plan Options Evaluation Summary

Both Plans Closed



# Summary of Results

		Segal Result	Gallagher Result
State Plan Closed (separated from Political Subdivisions)	Baseline Result	\$163M	\$301M
	Results Reflecting 7.5% Investment Return		\$457M
	Results Reflecting Alternative Demographic Assumptions		\$191M to \$366M
	Results Reflecting Investment Volatility (Repeating the past 20 years)		\$289M to \$699M
		Segal Result	Gallagher Result
Plan Closed for State and Political Subdivisions	Baseline Result	\$99M	\$445M
	Results Reflecting 7.5% Investment Return		\$705M
	Results Reflecting Alternative Demographic Assumptions		\$279M to \$545M
	Results Reflecting Investment Volatility (Repeating the past 20 years)		\$442M to \$1,098M



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# Thank You

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